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Summary

BERKELEY WATERFRONT PLAN

Summary of Opportunities and Constraints

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SUMMARY OF OPPORTUNITIES AND CONSTRAINTS

INTRODUCTION AND PURPOSE

There are three kinds of constraints which limit or define appropriate development on the Berkeley Waterfront: capacity limits, such as traffic and utilities, sensitivity constraints such as visual and environmental resource value, and policy constraints. The first two can be dealt with in a fairly straightforward way and can usually be expressed as quantifiable limits and/or specified mitigation measures. The policy constraints are a different matter. Only a few can be expressed in hard terms, mainly because public policy regarding this site is only now being established. Even more to the point, the policies that do exist often have contradictory implications. For example, provision of a maximum amount of recreation space, if taken literally, would conflict with provision of a maximum amount of job and revenue-generating development.

The purpose of this Opportunities and Constraints summary is to:

1. Document the existing conditions and planned improvements for the Waterfront and surrounding context (these will eventually be recast as the Existing Setting portion of the environmental impact report).
2. Distill the overriding constraints and the special site opportunities that should be incorporated into the land use alternatives.
3. Serve as an information base for the Evaluation of Alternatives phase.

Thus, this report is both an integral part of the environmental assessment process, and the foundation for public evaluation of the implications of alternative policy choices. The City's policy emphasis will gradually be translated into measurable evaluation criteria, land use alternatives will be assessed relative to those criteria, and the community can make an informed choice among conflicting priorities, and thus among potential plans.

In very brief form, key findings to date are as follows:

Land Use/Public Policy: The site represents a prime opportunity to link the city to the major amenities of the Waterfront, and to foster beneficial effects on surrounding land uses. The key obstacle to integrating the Waterfront with the city is the physical isolation created by the Interstate 80 freeway. The major source of public policy for the site is the City of Berkeley; other regulatory agencies include BCDC, U.S. Fish and Wildlife Service, California Department of Fish and Game and National Marine Fisheries Service.

Environmentally Sensitive Areas: The site offers significant opportunities for enhancement of environmental and visual resources, which can be a component of the recreation/open space system, and with proper mitigation can also

be compatible with development on a portion of the site. However, the existing site is a man-made artifice that will require significant mitigation and enhancement programs to foster natural processes and accommodate increased human activity.

Recreation/Open Space: The plan for the site must create a strong link in the continuous East Bay Shoreline trail system, of a sufficient size and quality to serve as a regional open space resource. There are a large number of recreational activities well suited to both the site and to identified needs, and the waterfront represents an ideal opportunity to accommodate many of these activities.

Traffic: Both transit and traffic access to the site suffer from the same problems: key access links are heavily loaded, restricting the amount of access capacity to the site unless expensive improvements are undertaken. Caltrans' proposed Interstate 80 corridor improvements will substantially increase capacity in the short term. However, before the year 2005, regional growth in travel demand will utilize that increased capacity, once again restricting access to the site. All but one of the existing bottlenecks will re-occur and traffic diversion levels will exceed current volumes. The only exception is the additional access capacity gained by improvements to the Ashby interchange. Transit opportunities are substantial, indicating the possibility of achieving a very high percentage of transit use at the site. But financial constraints affecting the regional transit systems will likely require developer subsidy of transit improvements.

Utilities: Several of the utility systems are insufficient to serve more than a minimal amount of development on the site. Some require only on-site improvements phased in concert with new development. However, others may require off-site improvements. For instance, an additional trunk sewer line would have to be run under the freeway to support more than 1.3 million square feet of office space or 1,100 dwelling units, including development on City land surrounding the marina. Such future connections to the main interceptor would have to be approved by EBMUD. Complicating the sewer capacity question is the fact that the main interceptor currently overflows during periods of wet weather, due to infiltration/inflow problems throughout the East Bay collector system.

Housing: There is substantial documented need for housing in Berkeley, and the Waterfront site could provide a variety of opportunities to help satisfy that need, through on-site development, off-site development, or contribution to the city's housing programs. In addition, housing need generated by development at the Waterfront or housing impacts created in adjacent neighborhoods will require a carefully tailored housing component to the Waterfront plan.

Economic Development: There is a significant amount of market demand for a wide range of uses, including uses which generate a high proportion of job opportunities targeted to Berkeley needs, and including both market rate and rental housing.

The next step will be to test the economic feasibility and fiscal impacts of various land use alternatives, and to determine the appropriate mix of uses that can at minimum be self-sustaining (i.e., carry the cost of necessary capital improvements and operating expense), and can potentially provide surplus revenues to fund other city priorities.

LAND USE AND PUBLIC POLICY

SURROUNDING LAND USE AND PROPOSED PROJECTS

The main aspects of the land use context which affect the future of the site are 1) the concessions and potential future development on city lands surrounding the Berkeley Marina; 2) the leases on Santa Fe property north of Virginia Street; and 3) trends and development patterns (uses, heights, open space system, potential linkages, etc.) in the surrounding area. These are discussed in detail under Land Use and Planning Context.

The most significant future projects in the vicinity are the redevelopment areas in West Berkeley and Emeryville and the plans now being prepared by Santa Fe and the City of Albany for the Golden Gate Fields lands just north of the study site.

EXISTING PUBLIC POLICY

City of Berkeley Policy for Site and Adjacent Lands. Proposals for the waterfront must conform to relevant provisions of the Master Plan. However, that plan designates the site "for further study", and gives only general principals for planning. For instance, the Master Plan implies that all commercial areas should respect the role of downtown as the center of commerce, government, and cultural activities for the city (Policy 1.20), and it identifies University Avenue and Interstate 80 as scenic routes.

City policy concerning the waterfront lands is more specifically expressed in the Preliminary Goals and Policies endorsed by the Council on January 17, 1984. These are now being incorporated by the consultants into the Evaluation Criteria by which alternative proposals for the waterfront lands can be judged; they will be refined as part of the continuing Waterfront planning process.

As for the areas east of the freeway, a portion is governed by the West Berkeley Redevelopment Area Plan, and a portion by the zoning ordinance. For instance, allowable heights in the Redevelopment Area range from 35 to 50 feet, and in the remainder of West Berkeley range from 35 to 100 feet. Allowable uses and other development standards are also guided much more closely in the Redevelopment Area, and provide a better indication of the city's recent intentions regarding the future of the West Berkeley neighborhood.

Policies and Proposals for the Adjacent Cities: The City of Emeryville is now in the process of revising the Emeryville Bayfront Development Plan, which is of major relevance to Berkeley Waterfront plans. A draft plan is expected to be released within the next few months.

In Albany, as already mentioned, the most significant factor influencing planning for the Berkeley Waterfront are the plans currently in preparation for the Golden Gate Fields lands. Conceptual plans by the property owner are tentatively scheduled for release in February 1985. In addition, the City has proposed a marina and commercial/recreational development in the Albany peninsula west of the racetrack.

Bay Conservation and Development Commission Policy: The BCDC jurisdiction zone is measured 100 feet inland from the point of highest tidal action (8.6 feet Mean Lower Low Water datum along the Berkeley shoreline). The BCDC San Francisco Bay Plan designates the entire west-facing shoreline zone of the site as waterfront park or a beach, and recommends development of public and commercial recreation areas. BCDC policy prohibits fill in the bay, except for minor fill rated to the improvement of shoreline appearance or enhancement of public access.

Miscellaneous Required Approvals: In addition to BCDC approval, a permit from the U.S. Army Corps of Engineers (COE) would be required for any proposed dredging, filling or construction in or affecting the Bay waters, up to the line of mean high water. A certificate from the San Francisco Bay Regional Water Quality Control Board (RWQCB) verifying satisfactory landfill closure for the Meadow and North Basin Strip would be necessary for COE and BCDC permits.

Development plans affecting water and shoreline areas must be reviewed by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and National Marine Fisheries Service (NMFS) for impacts on the area's natural and wildlife resources. These agencies may recommend approval or denial of Corps and BCDC permits, and recommend conditions and mitigation measures for certain impacts. Comments from these agencies are coordinated through the State Resources Agency and forwarded to COE for inclusion in its permit application process. There are on-site opportunities to address goals of the USFWS and CDFG by protecting and enhancing wildlife values.

The City of Berkeley, on behalf of the State Lands Commission (SLC), must find that development plans are consistent with the public trust easement which covers all water areas around the site.

ENVIRONMENTALLY SENSITIVE AREAS

The Berkeley Waterfront exists by virtue of extensive, prolonged human manipulation of the Bay shoreline. A series of essentially "unnatural acts" has created a relatively "natural" formation of land and waters that is now an integral part of the East Bay shoreline. As such, the planning area enjoys great opportunities for further physical manipulation and improvement of land and shoreline into a number of possible uses. The same human actions that were responsible for these opportunities, however, created certain potential liabilities (constraints) that require special attention. The site's position

in Bay waters and overlying unconsolidated Bay muds requires careful siting of structures, closing of old landfills, special design of foundations, protection of shoreline stability, conservation of Bay tidelands and wildlife habitats, and a judicious approach to any developed use of the surrounding aquatic environment. The wind that buffets this flat man-made promontory, and the noise levels from adjacent freeway traffic, impose their own kinds of constraints on any designed use of the site.

The section following summarizes the primary physical and biological conditions which on the one hand exhibit existing values and suggest new opportunities, and on the other, are sensitive and thus impose limitations and special conditions on development and use.

GEOLOGY, SOILS, AND LANDFILL CLOSURE

Availability of Undeveloped Land: The major opportunity at the site is the availability of a large area of undeveloped land in an otherwise heavily developed urban setting. After landfill closure, in accordance with State specifications, about 167 acres of flat, open space will be suitable for development for recreational, residential, commercial or other uses. (Development at the Brickyard will not require specific landfill closure measures.)

Landfill Closure: The primary constraint which will determine the location and design of development on the site is the necessity for appropriate closure of the landfills. Preparation and construction on the site could interfere with the closed landfill by reversing or disrupting any of the measures undertaken during landfill closure. For example, no major excavation can occur on the site; this precaution will preclude the installation of substantial underground structures. However, shallow underground utilities can be installed at the site.

Settlement of the site is a function of both underlying unconsolidated bay mud and compaction properties of the land fill. The rate of ongoing settlement will increase at least temporarily from the placement of additional fill and structural loads on the landfill. The Meadow fill will experience more future settlement from applied load than the North Basin Strip or Brickyard. Therefore, structures on the Meadow will require more elaborate foundation design than on other portions of the site. Portions of the Meadow will also require additional filling to raise the ground surface elevation. The North Basin Strip, while at a sufficient elevation, has too thin a soil cover in parts for effective closure of the landfill. Filling will thus be necessary to increase the soil cover depth. Settlement will occur on the North Basin Strip from past filling and future structural loads, but is expected to be less than that at the Meadow. Low structures (two stories or less) at the North Basin Strip will not require the pile-supported foundations which would be required on the Meadow. The Brickyard requires no additional filling before development. Because of the nature of the fill material, settlement is not expected to occur there from either past or future loading. Buildings of up to three stories could be constructed without pile support.

Differential Settlement: Landfill materials as well as bay mud exhibit varying conditions of consolidation, decomposition, and compaction, causing settlement to occur at different rates and amounts. Differential settlement is more likely to continue at the Meadow than at the North Basin Strip, and is least significant at the Brickyard. Utility lines and structures will require special design and construction to resist damage from differential settlement.

Seismic activity (earthquakes; tsunami waves) could result in human injury and property damage at the site. Proper design and construction of buildings will reduce the potential for damage. Secondary effects such as ground lurching and rupture could destabilize the perimeter slopes facing the Bay. Structures should not be located near these slopes.

Methane generated by continuing decomposition of landfill material could be a significant hazard at the site. Large expanses of pavement will promote the accumulation of methane, increasing the hazard of ignition or explosion of the gas. Open, unpaved areas will facilitate venting of the gas, reducing this hazard. Detectable amounts of methane have accumulated at the North Basin Strip, and methane generation can be expected at the Meadow. The rate of methane production at the Meadow and North Basin Strip is probably decreasing and will continue to decrease because of the age of the fill material. The Brickyard does not generate significant amounts of methane. Venting systems to prevent the accumulation of methane will eliminate this hazard at the Meadow and North Basin Strip.

Shorelines and Beaches: The extensive shoreline of the site is almost entirely rip-rapped to prevent erosion and maintain stability. The need for this kind of shoreline protection is not likely to change. However, beaches could be developed along certain segments of the shoreline to create new opportunities for water-related recreation in Berkeley. Areas undergoing current sediment deposition probably represent the most stable locations for beaches. These include Brickyard Cove, a portion of the North Basin, and the Ashby shoal. A beach could probably be constructed using nearby sand sources. A preliminary study of sediment from the Ashby Shoal indicates that there is suitable material. Man-made beaches at any sites would be subject in varying degree to erosion by waves and currents. For example, instability and erosion of the man-made Crown Beach in Alameda have been recurring problems. Replenishment of the sand at that beach and construction of sheet-pile dikes perpendicular to the shore have been required to decrease erosion. While these measures have retarded the amount of erosion of the beach, further measures to stabilize the beach will probably be necessary. Similar problems will occur at the Berkeley site if a beach is constructed at a location which is exposed to wind and wave erosion. A study to assess the long-term stability should be undertaken before constructing a wet beach at any location.

Alternately, a dry beach, protected from wave erosion by a seawall, could be constructed at any of the possible sites. However, the physical separation of the beach and Bay water may detract from the recreational value of the beach.

Constructing a seawall will increase the initial cost of a beach but reduce future expenses for beach replenishment and stabilization; an intertidal ("wet") beach will be less costly initially, but may impose higher maintenance costs. Either a "dry" or "wet" beach will require a fill permit from BCDC and the Army Corps of Engineers, as discussed under Public Policy.

HYDROLOGY, DRAINAGE, AND WATER QUALITY

Water Quality. The site enjoys an extensive Bay shoreline, suggesting numerous kinds of water-related recreation, such as boating, fishing and swimming. A beach, as suggested above, would greatly enhance the present shoreline for recreational activities. However, the poor quality of Bay water in the site vicinity may limit water-contact recreation. This constraint can be mitigated either by locating the beach away from sources of pollution, or by improving the quality of water discharged by the creek and storm drains in the vicinity. Both approaches are considered here briefly.

A monitoring program of water quality in the vicinity could identify the areas of best water quality where body-contact water recreation would be safest. These probably occur along segments of the shoreline that are farthest from the outfalls for Codornices, Schoolhouse, Strawberry and Potter Creeks. Alternatively, the outfalls of the creeks could be extended further onto the Bay or moved laterally to discharge at a safe distance from water recreation areas.

The outflow from the storm sewers theoretically could be treated before release into the Bay. However, treatment of storm runoff would probably be infeasible because of the cost and lack of available treatment capacity. Control of this pollution at its source is very difficult, since the sources of urban pollution and runoff are so widely distributed throughout the urban watershed that is drained by the creeks. Regular cleaning of streets, catch basins, and storm sewers, and enforcement of anti-dumping ordinances, could improve the quality of water discharged by storm outfalls. Public education is necessary, however, to decrease littering, illegal dumping of wastes into storm sewers, and improper disposal of animal wastes.

Installation of sand filters at creek outfalls could supplement the benefits accruing from more effective pollution source control in Berkeley, to the benefit of the quality of near-shore water. Filters do require proper maintenance and periodic cleaning to function properly.

Flooding. The site is susceptible to flooding from high tides and tsunamis. Portions of the Meadow and North Basin Strip will be unsuitable for placement of structures until filled to acceptable elevations. Flooding could also be prevented by raising the level of perimeter dikes at the site. The Brickyard is wholly above the level of the 100-year tide and tsunami, and can be developed without new filling or improvement of dikes.

Leachate. The presence of subsurface leachate at the site prevents the use of groundwater at any locations on the site. Large or deep excavations could induce leachate to escape into the surface environment or into adjacent Bay waters. Therefore, no underground structures can be built at the site.

Drainage. Proper grading to create positive drainage, and an effective storm drainage system will be necessary on developed portions of the site. Undeveloped portions will also require effective drainage to minimize water infiltration and generation of leachate in the landfills. The proximity of the Bay to the site provides a convenient body of water for the discharge of runoff. However, urban pollutants in runoff from the site will further deteriorate the quality of near-shore water if allowed to drain into the Bay without at least minimal treatment (e.g., sand filters).

BIOLOGICAL RESOURCES

Upland terrestrial habitats. Several important opportunities exist within the project area to protect and enhance the biological value of both terrestrial and marine habitats. On the existing man-made uplands, at present a mix of ruderal ("weedy") and barren, littered areas, new habitats can be developed, ranging from fully landscaped to "semi-natural" areas which could maintain existing wildlife as well as attract more diverse wildlife. Areas in the Berkeley Marina and the completed portion of the North Waterfront Park, neighboring the project area on the west, serve as examples of some of the successful landscaping approaches that are available, using native or naturalized plant species.

The opportunities to protect and enhance the area's wildlife use do not preclude development if land uses and development sites are carefully selected, separated, and buffered. However, there are some clear and potential constraints to development, if habitat is to be maximized. If most of the existing upland areas are developed and/or landscaped, ruderal vegetation and its associated wildlife will be displaced. This weedy cover, while not aesthetically attractive, provides useful habitat for a number of common bird and animal species.

Exposure to persistent wind and salt air conditions, as well as the soil conditions, will constrain the plant species that can be used to landscape developed and open space areas. However, both native and naturalized plants have been used successfully in landscaped areas of the Berkeley marina.

Shoreline. Similarly, the shoreline exhibits great potential for protecting and improving fish and wildlife habitat and recreational use. Generally, a clean-up both of litter and of water quality from storm drain effluent entering the project area would be a step toward improving existing habitat. More elaborate proposals to create or expand habitats by introducing mixed structural and vegetative assemblages could increase the ecological values of the shoreline area, but will have to be carefully designed. Possible enhancement

projects include: mudflat enhancement and encouragement through revegetation of a salt marsh in Brickyard Cove; creation of a bird refuge by cutting off the southern tip of Brickyard spit as an island and creating diversified "niches"; and creation of transition buffer zones between lands along the North Basin and South Basin strips.

Intertidal and aquatic habitats. Intertidal and submerged mudflats along the site's water perimeter are valuable wildlife areas, particularly for shellfish and water birds. Particularly in the fall, winter, and early spring, waterfowl and shorebirds make heavy use of the shallow Berkeley shore and water areas. Any development that would reduce or eliminate these areas or disturb wildlife during peak periods of use would adversely impact the area's biological resources, either temporarily or permanently. Activities that may alter the existing mudflats include: any dredging; filling to create beaches; attempting to establish a salt marsh in the northeast corner of Brickyard Cove, at the expense of the mudflat (which, in itself, is a highly productive intertidal habitat) should be carefully considered.

In addition, wildlife use of the water-related portions of the project area, specifically by water birds in Brickyard Cove, would constrain the types of land uses that would be appropriate for adjacent areas, and may dictate the need for buffer zones. For example, plans to provide a beach for public recreation use in or adjacent to Brickyard Cove may conflict with water bird use. Bird numbers in this area increase in August and remain high through spring, leaving only a few months in late spring and the first half of summer when bird use is relatively low and when conflicts between human and bird activities would be minimal.

Finally, continued poor water quality at storm drain outfalls could detract from shoreline habitat enhancement efforts.

CLIMATE AND AIR QUALITY

Climate. Site planning should be done with a persistent west wind in mind. Buildings should be aligned in a north-south orientation, forming interior corridors and courts that are sheltered yet exposed to the south for sunlight. To minimize infiltration of cool air, doorways should be located on the east or interior side of the buildings. Landscaping should include dense trees and shrubs that could serve as windbreaks.

Air pollutants. Development along the I-80 corridor will be subject to potentially high concentrations of carbon monoxide (CO). This could restrict developments to non-sensitive uses, since the measures to reduce CO concentrations are limited. "Sensitive uses" generally are defined to include residential areas, playgrounds, schools, hospitals and nursing homes.

NOISE

Development along the I-80 corridor will be subject to high noise levels. Special design measures will be required, such as noise walls, use of certain building materials, or installation of noise insulation, to achieve acceptable interior noise levels. Even so, it may be difficult to adequately reduce noise levels in exterior developed locations and in open space recreation areas along I-80.

VISUAL RESOURCES

The following descriptive text will be used in conjunction with the series of photographs in the Visual Resources section to formulate the specific criteria against which visual impact will be measured.

Views from the Site. There are several points on the waterfront which afford unobscured and dramatic views to the Bay, especially the Brickyard Spit, the western portion of North Waterfront Park, the frontage road south of University, and Shorebird Park. Other areas provide important views back to the Berkeley hills; notably the eastern portion of North Waterfront Park and the axis of University Avenue.

In addition, there are several key points of orientation, such as the entrance to the site from the east (at University), and from the south (Frontage Road at the Brickyard).

All of these views from and within the site are important resources to be protected by guidelines or regulations on the location, pattern, and massing of landscaping and development.

View Corridors. The most important view corridor is the one created by University Avenue from Martin Luther King Way to the site. Gilman Street is next in importance, because it provides both a physical and a visual link to the site. These two view corridors should receive special treatment, such as landscaped open space, limitation of building heights, and possibly landmark features of some sort, to reinforce the connection of the waterfront back to the city.

The pattern of open space and development should also respond to the remaining east-west streets and visual corridors on the other side of the freeway.

Views from the Hills. As described in Visual Setting, these are not the most constraining factors in visual sensitivity of the site. From the hills, views of the Bay, the San Francisco skyline, the bridges, and the Marin Hills far overshadow the importance of the waterfront lands, even at the lowest-elevation view impact zone. However, the open space and development pattern should be imageable and attractive as viewed from this perspective.

Views from the Freeway. Presently, the freeway divider fence and landscaping obscure views toward the waterfront at many locations. Future edge treatment and landscaping of the freeway should respond to opportunities for views to the Bay, as should the location and massing of development and site landscaping.

UTILITIES

The Utilities section of this report details the existing infrastructure systems: sewer, water, electric, storm drainage, gas, and telephone. For the last three, service to the Berkeley Waterfront probably does not pose any problems that cannot be handled by on-site improvements phased in concert with new development. Electric service may be more of a constraint, since a new 21,000 volt system would have to be run in from Pacific Gas and Electric's El Cerrito Station if more than 1,000 residential units or an equivalent amount of office space are planned on the waterfront lands. Sewer and water constraints are summarized below.

Sanitary Sewer. The existing sanitary service to the waterfront area is adequate to support current demand but would be incapable of supporting new large-scale development without improvements. First, although the collection system does have additional capacity, it is to be reserved for development on public lands in the marina area. Therefore, any development on private lands would be responsible for a collection system to get sewage to the 16-inch line extending under the freeway.

The more important constraint to development is that of treatment capacity. The interceptor flows only half full during dry weather, but overflows during periods of wet weather. EBMUD has indicated that full use can be made of the existing 16-inch connection to their interceptor, but additional connections could be a problem: another eight-inch connection to the interceptor would be probably be allowed, a 12-inch connection might be allowed and a 24-inch might not be allowed. However, any future connections would need to be evaluated in terms of the type of development anticipated before a decision could be made. The following table depicts preliminary estimates of the levels of residential or commercial development which could be supported by available capacity in

the existing 16-inch line under the freeway and by a range of additional connections. These are preliminary and will be refined further as additional information becomes available.

TABLE 1

	Existing Capacity		New 8"	New 12"	New 24"
Residential Dwelling Units	1,100 or	plus	506 or	1,500 or	10,000 or
Office 1,000 sq. ft.	1,300	plus	618	1,800	10,000

Water. Water service to the waterfront area is currently provided by EBMUD with a 12-inch line under the freeway at Hearst Avenue and another at Gilman Street. EBMUD has identified two water-related constraints for new development: fire flows and domestic consumption. The City of Berkeley has stated all new structures in the waterfront must be equipped with automatic sprinklers for fire protection, and that the two existing lines must be looped or connected. Preliminary estimates indicate that if the two lines are looped approximately 2,500 to 3,500 gallons per minute (gpm) would be available which may meet fire demand dependent upon the type of development anticipated. The City Fire Department has indicated business districts or industrial areas can require as much as 4,000 gpm assuming sprinkler protection, dependent upon the actual level and type of development. Residential development would require in the order of 2,000 gpm. Dependent upon the amount and type of development anticipated, improvements may be necessary to support domestic consumption. EBMUD indicate the current lines, when looped, could probably support upward of 1,000 dwelling units but not significantly more. If additional development is anticipated, another line will probably have to be extended under the freeway to a 33-inch line in San Pablo Avenue.

TRAFFIC AND TRANSPORTATION

Existing Traffic Constraints. Inadequate freeway capacity and existing congestion on I-80 limit access to the Berkeley waterfront from the south and to the north during the evening northbound congestion between the Bay Bridge and Ashby Avenue causes the diversion of traffic from the freeway to parallel routes such as West Frontage Road, Sixth/Seventh Street and San Pablo Avenue. The lack of full directional access to the waterfront at the Ashby and University Avenue interchanges shifts the demand for northbound I-80 access to the Gilman and Powell Street interchanges resulting in an uneven distribution of interchange traffic.

Although freeway diversion places an unnecessary traffic burden on the intersections and interchanges serving the waterfront, a key constraint on access if the operational complexity of the traffic "gateways" to the site.

All traffic - whether it be regional traffic on the freeway or local traffic on public streets east of the freeway - can only reach the Berkeley waterfront by passing through one of four interchanges: at Powell, Ashby, University or Gilman. The close spacing of intersections at the Gilman, University and Powell interchanges creates operational problems which reduce the traffic capacity of the interchanges.

Traffic Constraints After Caltrans Improvements. Although vehicle demand in the I-80 corridor will continue to increase through the year 2005, Caltrans' proposed widening of the freeway should provide initial relief from the morning southbound and evening northbound congestion that is currently being experienced. This reduction in freeway congestion could be expected to reduce the amount of northbound and southbound freeway traffic currently diverting to parallel routes such as West Frontage Road and Sixth/Seventh Street. Reconstruction of the Ashby and University Avenue interchanges to provide full directional access would spread the traffic demand more evenly to the Gilman, University, Ashby and Powell interchanges. The reduction in freeway diversion and better utilization of the Ashby and University interchanges would result in fairly low levels of interchange utilization with considerable capacity available to accommodate additional traffic from new development in the waterfront area.

At some time before the year 2005, northbound and southbound traffic demand on I-80 during peak periods is projected to exceed the increased capacity of the freeway, producing congestion and freeway diversion exceeding current levels. If this were to happen, waterfront traffic capacity would be limited to the amount of additional capacity created by the reconstruction of the Ashby Avenue interchange unless further improvements were made to the interchanges.

Potential modifications would be limited by the willingness of Caltrans to approve the changes, the need for additional right-of-way along the waterfront and the costs and potential benefits of the improvements. Any widening of freeway on-ramps could produce freeway volumes at the merge point with I-80 that exceed the capacity of the freeway lanes. If this were the case, Caltrans would probably be unwilling to approve the ramp widenings. It should also be remembered that the effectiveness of any on-ramp widenings would depend on the ability of traffic to get through the traffic signals to the ramps. Increasing ramp width does not improve development potential if intersection capacity prevents utilization of the additional ramp lanes. Widening of off-ramps is an improvement that may receive little opposition from Caltrans and whose feasibility would depend on the availability of right-of-way. Widening of West Frontage Road or the east-west arterials would also increase capacity, but would be expensive and probably require additional environmental impact studies.

Transit/Ridesharing. Increases in freeway and local intersection congestion would probably create a greater use of transit and ridesharing. A similar shift in transportation modes and increase in auto occupancy have been

observed in transbay traffic due to congestion on the Bay Bridge. The existing transit system serving Berkeley and the waterfront site do have unused capacity available on local routes and in the off-peak direction on transbay routes.

The Berkeley Trip office and the RIDES program, offer local mechanisms for coordinating transit and ridesharing activities. It is therefore assumed that a relatively high shared ride and transit mode split can be achieved on this site.

Transit access to the Berkeley waterfront suffers from much the same problems as vehicular traffic access: key links in the route serving the site are heavily-loaded (e.g., between Rockridge BART and the UC campus on the 51M line and the Transbay Tube on BART) restricting the amount of additional patronage that can be accommodated without expensive capacity expansions. Service improvements on BART would increase capacity systemwide, but the majority of the improvements would benefit Concord/Daly City commuters. Any improvements in AC Transit service to the waterfront to accommodate development would probably have to be funded in large part by the developer.

Given that the automobile is still the most frequently used form of transportation for most land uses, the traffic capacity of the four interchanges providing access to the Berkeley waterfront would probably be the key transportation constraint on waterfront development. Traffic conditions might not be as bad as Caltrans has projected if development were to occur at the waterfront instead of farther north on I-80 or if the travel patterns associated with waterfront land uses were oriented in the off-peak direction where more capacity existed. Development of a plan for the Berkeley waterfront should consider not only the short-term traffic capacity for development but also the lower, long-term traffic capacity and the need for additional improvements. It should also be remembered that the traffic capacity of the study area intersections serves not only the Berkeley waterfront but also downtown Berkeley, West Berkeley, Emeryville and Albany access needs.

RECREATION AND OPEN SPACE

The following section will summarize the major policy direction and specific recommendations for each of the nine recreation/open space categories to be potentially located on the Berkeley Waterfront: regional open space, shoreline trail, sports facilities, environmental preserves, boating/marina facilities, visual/scenic activities, social/educational activities, fishing/beach activities, and overnight lodging/camping.

Regional Parkland and Shoreline Trail. Because of the size of the site, its strategic location and accessibility, and the fact that there are already almost 100 acres of existing and proposed parks on the study site, a future park is bound to serve more than the local Berkeley population. Therefore, parkland standards and policies should also encompass both local and regional

perspectives. There is a broad and unquestionable consensus for a regional-scale park and shoreline trail on the site. There is less definite data on the exact size of such facility. However, a new park incorporating the already-proposed North Waterfront Park could easily fulfill the East Bay Regional Parks District criteria for a Regional Shoreline and Regional Recreation Area: 100 or more acres, capable of both intensive public use and preservation of significant environmental features, etc. (see EBRPD Existing Facilities for complete list of standards and guidelines).

Sports Facilities. By some assessments, outdoor sports and games have the highest annual demand of all outdoor recreational activities. Considering that the City of Berkeley is notably deficient in playing fields, it is recommended that the study site provide opportunities for both structured playing fields and open meadows suitable for informal games. At minimum the Parks and Recreation Commission requests a 25-acre lighted outdoor sports complex, in addition to an appropriate component of informal fields and meadows.

Environmental Preserves. The only potentially sensitive environmental areas which have been identified on the Berkeley site are the mudflats at Brickyard Cove and the stream outlets. The mudflats have been consistently mentioned for possible enhancement as marshland wildlife habitat and the stream outlets are specifically recommended for enhancement by the Parks and Recreation Commission. These should be considered as "givens" for the purpose of planning, subject to further evaluation of feasibility and cost implications.

Boating/Marina Facilities. The need for such facilities as launching areas, temporary moorings, and marinas is growing with boat ownership in the Bay Area, at a rate three times as fast as population increase. There are long waiting lists at existing facilities, including the Berkeley Marina. To the extent appropriate and feasible, these kinds of facilities should be a part of proposals for the study site.

Visual/Scenic Activities. The State Department of Parks and Recreation emphasizes the scenic value of the site, and recommends incorporation of viewing areas on the Brickyard Spit, Ashby Spit, and at the tip of North Waterfront Park.

The Coastal Conservancy did an independent view study of the site, which is detailed in the Visual Setting elsewhere in this report. Relevant at this point are their recommendations for view corridors corresponding to University Avenue and other streets east of the freeway, and their emphasis on maintaining significant views from the freeway and from the hills. These objectives will be translated into more specific requirements in the Evaluation Criteria.

Social/Educational Activities. The most frequently recurring suggestion in this category is some sort of interpretive center as part of a Brickyard Cove nature preserve. Other social/cultural activities frequently mentioned as

desirable for the site include a public conference center, an outdoor theater, and a public marketplace. Other potential uses of this sort, suggested in community proposals, are listed in the final section of this analysis.

Fishing/Beach Activities. This category includes not only fishing and swimming, but a wide variety of other activities: windsurfing, sunbathing, jogging, strolling, beach games, etc. According to East Bay Regional Park user studies, these are among the most popular recreational activities (see detailed description in later section of this analysis). As such, they should be incorporated to the maximum extent feasible within any proposal for the study site, subject to include environmental, design, and cost considerations.

Overnight Lodging/Camping. The State Parks Department addresses the need for this category of facilities in its proposal for the site, recommending that 50 to 100 individual sites (up to 25 acres) and 15 acres of group camping be located on the North Waterfront Park, and that a hostel complex (30 to 100 overnight visitors), a conference center (seating capacity 3,000 and overnight accommodations for 700) be accommodated on the Meadow.

These proposals are a useful indication of the size of facilities appropriated from the point of view of the State Department of Parks and Recreation. They may or may not be the location or size consistent with other aspects of Berkeley's desired plan for the waterfront. These questions will be addressed in the subsequent Evaluation of Alternatives phase of the planning study.

HOUSING

The housing strategy for the Berkeley Waterfront Plan should respond directly to the City's current housing policies and programs, as discussed in the Housing section of this report and summarized below:

1. As one of the last major land reservoirs in Berkeley, the waterfront provides an opportunity to plan a significant number of dwellings to serve the city's housing needs through the year 2000.
2. Development on the waterfront creates the opportunity to increase housing production in Berkeley to serve the needs of all segments of the population. In addition, there will be opportunities to provide housing for those with special shelter needs, including families, blacks, the elderly, the disabled and those with low or moderate income. New housing could be built on the waterfront, in existing neighborhoods, or in a combination of the two.
3. Development on the waterfront creates the opportunity to enhance neighborhood preservation policies of the city's Housing Element and Housing Action Strategy. This can take the form of contributions to rehabilitation programs, rental assistance programs, home ownership programs and reactivation of vacant units.
4. The provision of housing on the waterfront in combination with other land uses can bring about a balance of jobs and housing, reducing the potential for gentrification, traffic congestion, energy consumption and associated environmental impacts.
5. The waterfront can provide housing that meets both the need and demand for housing in Berkeley.
6. The size of the waterfront provides an opportunity to reach a "critical mass" of housing such that a true neighborhood could be established.
7. The inclusion of housing on the waterfront can assure an active, 24-hour environment.

However, there are a number of physical constraints to housing development, more fully discussed in the environmental section of this report, and summarized below:

1. Noise and air pollution constrain the location of housing adjacent to the freeway.
2. Soil conditions constrain the location of housing along many areas of the waterfront unless expensive foundation work is undertaken.

3. The cost of construction on unstable soils could limit housing to middle and high-rise buildings priced out of reach of those most in need of housing.
4. Methane gas odors could constrain housing and other uses down wind of the dump site.
5. Strong winds constrain the siting of housing along the water's edge unless wind breaks or other mitigations are provided.

ECONOMIC DEVELOPMENT OPPORTUNITIES

There are few hard constraints to economic development on the waterfront. Rather, the constraints arise from the tradeoffs between the positive benefits of development, such as jobs and revenues, and other interrelated factors: market demand, type and intensity of development, economic and engineering feasibility, and especially the policy priorities the City chooses to emphasize. The following section will summarize economic development opportunities and constraints under three headings: Employment, Market/Financial, and Fiscal considerations.

EMPLOYMENT

Waterfront development offers the opportunity to inject new vitality into the economy of the city while providing job opportunities with growth potential as well as jobs for those with limited education or training. There are opportunities for major commercial development, construction, joint public/private development, and programs for minority participation in entrepreneurial activities. Many goals and objectives of Berkeley's economic development plan can be implemented concurrent with waterfront development.

1. The waterfront could provide a wide array of job opportunities for the residents of Berkeley, reducing the need for residents to commute out of the city.
2. The waterfront offers the opportunity to broaden the employment base of the city.
3. Profitable development such as offices on the waterfront can generate surplus that can be used for job training and other employment programs.
4. Employment associated with retail and commercial recreation on the waterfront could provide jobs for low-skilled residents and displaced workers.

Potential constraints to economic development are discussed in other sections of this report, and include the following:

1. Traffic congestion on the freeway constrains the amount of employment that can be supported on the waterfront.
2. Industrial uses on the waterfront are constrained by the difficulty of access, the absence of land suitable for one-story plants and surface parking, the limits of sewer and water utilities, and the presence of sensitive environmental conditions.
3. The growth of employment in San Francisco, Contra Costa County and south Alameda County represent the major potential competition to the development of the waterfront as a regional office center.

MARKET/FINANCIAL CONSIDERATIONS

The site represents a unique economic opportunity because of its strategic regional location, with access to a large amount of the East Bay population and proximity to San Francisco. Its primary economic attribute is its ability to serve a growing market of more than one million persons with activities such as commercial office, hotel and related services, and residential.

Residential

Opportunities for market rate housing are significant. The primary market consists of households who would otherwise choose to live in Alameda County or Western Contra Costa County. There is a secondary market consisting of households who would otherwise locate in San Francisco or Central Contra Costa County.

The primary market area will experience substantial growth in population and employment, which will provide opportunities for new housing on the waterfront.

A constraint on the potential residential market at the site is the cost of new housing. Because of site conditions and other constraints, the cost of building new housing may command a premium over that charged by the competitive housing units in the East Bay. The higher the cost of new housing at the site, the thinner the potential market for such units.

There is a market in the East Bay, composed largely of established households who choose for a variety of reasons to move within the market area, and who have the money and income to afford new housing. In the primary market area, these are approximately 6,000 such households annually, 4,000 new owner-occupied and 2,000 market rate rental. There is already competition for this relatively small market from existing developments in Alameda, Emeryville and

Richmond. Also, if the Mission Bay and Rincon Hill developments in San Francisco are built as planned, they could compete with residential development at the Berkeley waterfront.

There is the opportunity to develop a residential community at the site. An absorption of 5 percent of the East Bay demand might be feasible if the unit cost can be kept reasonable.

The constraint on the residential market is that costs may be too high in relation to amenity and value to deter absorption of a significant enough number of units to be feasible. An additional constraint to developing new rental housing is Berkeley's rent control.

Retail

Because it is Berkeley's policy to concentrate general retail in the Downtown, the types of retail considered as opportunities for the Waterfront are:

1) specialty retail, and 2) possible support commercial for other on-site uses.

Internally-Supported retail/commercial depends chiefly on other uses on site or in the immediate vicinity for its clientele. For example, 100,000 square feet of office space would provide a market for approximately 1,000-2,000 square feet of support commercial such as food establishments, drugs store, barber, tobacco shop, stationery store, and printing shop. A residential development of 1,000 housing units would generate demand for a small convenience shopping center of approximately 15,000 square feet, 80 percent of which would be a supermarket, and the remainder several specialty stores.

Externally-supported specialty retail depends on a clientele from a larger market area, and this competes with other facilities in the East Bay. However, the Berkeley site appears to be well located with respect to a relatively underserved market area between Hayward and Richmond. Considering the amenities of the waterfront location, the site provides a prime opportunity for a complex to include waterfront-related retail, restaurants, and specialty shops. Size has yet to be determined, but analogous developments in the Bay Area include Jack London Village in Oakland, at 65,000 s.f., and Larkspur Landing adjacent to the Ferry Terminal, at 175,000 s.f.

Conference Center

There appears to be a market for a small scale conference and exhibition center on the order to 50,000-70,000 s.f., analogous to the conference center in Monterey. The market is chiefly education and business-related events generated by the University of California, its associated centers and affiliates, and area colleges and businesses. The opportunity is substantiated by the shortage of first-class conference facilities in the area, and the special attraction of the Berkeley Waterfront site. It is important to recognize the

symbiotic relationship between hotels and conference centers, i.e., the presence of a conference center stimulates hotel occupancy and the presence of hotel rooms enhances the success of a conference center.

Office Space

The East Bay will experience substantial growth in white collar employment, which will, in turn, lead to increased demand for office space. In the primary market area (Alameda County), the office space demand by the year 2000 will total 23,562,000 square feet.

The site is attractive to firms who desire to locate in Alameda County or Western Contra Costa County. In addition, it would be attractive to some firms who would ordinarily be attracted to Central Contra Costa or San Francisco. The latter depends on relative prices of office space, and on incipient development controls on office space growth in San Francisco and Central Contra Costa and Southern Alameda Counties.

Given a competitive rent structure, the Berkeley waterfront site would be able to absorb up to 10 percent of the East Bay's growth in a new office space, i.e., up to 2.35 million square feet.

Hotel/Motel Space.

Demand for accommodations in the East Bay will grow as the economy and population continue to grow. The lodging market in the East Bay after 1985 will be on the order of 225 rooms per year. Current plans for new hotels and additions in the East Bay will satisfy that demand for the immediate future (1985 through 1988). After that, the East Bay market should be able to accommodate 600 to 700 new rooms at the waterfront site beginning 1990 to 2000.

High Tech Uses

Proximity to the University of California and major business centers makes the site ideal for certain kinds of office tenants with businesses geared to high technology. Engineering firms, testing laboratories, computer software, developers, specialized "think tanks" and other such organizations would find the ambience of a waterfront site attractive.

The site is not ideally suited for high-tech manufacture, such as electronic components or computers. There are many alternative sites for that kind of activity. However, the intellectual parts of high-tech research and development could be well suited to the site. These are specialized kinds of office space that have more in common with white collar employment than with manufacturing.

FISCAL CONSIDERATIONS

Fiscal information at this early stage is limited to a description of the current categories of city costs and revenues, and of the thresholds for required service expansion likely to be encountered if the site is developed. As described in the last section of this report, potential costs to the City include utility, street, and infrastructure maintenance, police and fire protection, increased administrative costs, and landscaping and parks maintenance/operations costs. Principal sources of revenue include property taxes, business license fees, sales taxes, and hotel occupancy tax.

Revenues

On a square foot basis, hotel use is the most lucrative source of revenue to the City - over \$5,000 per 1,000 square feet. Next is retail, at \$2,415 per 1,000 square feet. Office generates \$955 per 1,000 square feet, and residential \$715 per 1,000 square feet.

Costs

The Waterfront lands will probably require substantial expenditure for both capital improvements and maintenance/operating costs. Some of these costs will be the same regardless of what uses are planned; others will vary by use and quantity of development. More description of costs will be prepared during the Refinement of Alternatives phase. Typically, the surplus of revenue over costs is highest for hotel development and lowest for parkland, with other uses falling generally in the order given above.

Potential Net Revenues

The major conclusion to be drawn at this point is that the waterfront lands represent a great opportunity for the City to provide a balance between land uses requiring city financial support and those that generate more income than cost.

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